ANNUAL REPORT

OF

THE DIRECTOR

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY

AT HARVARD COLLEGE

TO THE

PRESIDENT OF HARVARD COLLEGE

FOR

1935-1936

CAMBRIDGE, U. S. A.:
PRINTED FOR THE MUSEUM
1936

PUBLICATIONS

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY

AT HARVARD COLLEGE

There have been published of the BULLETIN, Vols. I to LXV, LXVI, No. 1 & 2, LXVII to LXXIX No. 1, 2, 3 & 4, and LXXX, No. 1, of the Memoirs, Vol. I to LIV No. 1, 2 & 3.

The BULLETIN and MEMOIRS are devoted to the publication of original work by the Officers of the Museum, of investigations carried on by students and others in the different Laboratories of Natural History, and of work by specialists based upon the Museum Collections and Exploration.

These publications are issued in numbers at irregular intervals. Each number of the Bulletin and of the Memoirs is sold separately. A price list of the publications of the Museum will be sent on application to the Director of the Museum of Comparative Zoölogy, Cambridge, Massachusetts.

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HENRY BRYANT BIGELOW	*Curator of Oceanography*
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REGINALD ALDWORTH DALY	*Sturgis Hooper Professor of Geology*

REPORT OF THE DIRECTOR

1935–1936

To the President of Harvard College:

Sir:—

Whether we like it or not the agreement between the original trustees of the Museum of Comparative Zoölogy and the Corporation of the University made at the time the Museum came wholly into University hands obligates us to maintain some public exhibition collections. The area devoted to these has been from time to time reduced and it is unlikely that it will ever be desirable to contract it further. This policy being established it is obvious that every effort must be made to make the exhibits not only as instructive but as attractive as possible. The labor involved in doing this is considerable and, from the point of view of a staff devoted to research, it is not particularly appealing. Nevertheless it is work which once done is finished for a considerable length of time.

Thanks to the generosity of Mr. George Agassiz it has been possible to substitute plate glass for the old and very inferior glass, in small panes, in the reptile room and for this same exhibit new and much more instructive labels have been prepared for almost all the specimens. New and much more illuminating labels have likewise been prepared for the vertebrate fossils, some of the vanishing and extinct birds as well as for a number of mammals in the general synoptic collection.

I wish here to record my gratitude for the constant help and assistance which I have had from many members of the staff in getting this work done this year. I do not mean to say that the task is by any means completed but it is far advanced beyond what it has ever been in the past. The increased attendance which began a number of months ago is due in part to the increased attraction of the exhibits and began long before the people became aware that the Tercentenary was approaching. In connection with this event we have set up a special exhibit showing the building which we now occupy at its various stages of development as well as of the other buildings which at one time or another housed the collections. Another case, attractively illuminated, contains examples of the

work of most of those who have, from time to time, illustrated the publications of the Museum. This exhibit is so unusual and the drawings themselves so beautiful that it will probably be maintained as a permanent feature.

During the year, with the aid of a number of curators and other officers of the Museum, a History and Guide to the Collections was published. The fact has been established historically that the University collection is the oldest in the U. S. and the times at which the various great private collections came into the hands of the University have been recorded, together with a statement of the research resources of each department of the institution as of this year. This little book will be absorbing to read in 2036.

During the winter I visited Soledad and spent some time discussing changes in the gardens as well as plans for future work there in view of the hurricane of September 1935.

During the year I also published a report, in joint authorship with Miss Margaret D. Porter, covering observations and recommendations concerning the conservation of wild life in South Africa based on two journeys during the two previous years.

The bibliography appended gives a full list of the writings of all members of the Museum Staff.

It, of course, frequently occurs that members of the Museum Staff are loaned as it were for special services to other institutions. Dr. Clark and Dr. Deichmann have been teaching in California and Dr. Bigelow is at Woods Hole in active charge of the Oceanographic Laboratory during the summer months, assisted by Mr. Iselin. My own work in connection with the establishment at Soledad in Cuba and the Barro Colorado Island Laboratory in Panama also make frequent absences necessary. In September 1935 the Rockefeller Foundation asked us to give leave of absence to Dr. D. Marston Bates to proceed to Albania and investigate certain problems connected with apparent physiological species of the genus Anopheles, vectors of malaria in that country. Doctor Bates has made considerable progress with his studies, so much so that the Foundation has requested the Museum Faculty to grant him leave of absence during the current year so that while his conspicuous talents are greatly missed it is a pleasure to report that they are being appreciated and made use of in this most important con-

nection. Dr. Bequaert is in Columbia in connection with a problem concerning the transmission of yellow fever. He also is temporarily in the employ of the Rockefeller Foundation.

On March 5, Mrs. Ellen Rooney died. Born in June 1856 she came to work in the Museum as a "Goody" on June 1, 1888. She retired a few months before her death. For 47 years she gave the Museum most faithful and devoted service.

Many years ago Mr. Agassiz sent the Blake collections of Alcyonarians to Professor Verrill at Yale to study and write a report. During the course of a versatile and active career Dr. Verrill had only occasional opportunities to work on these collections. From time to time, to be sure, plates were prepared and printed against the appearance of the final report. To make a long story short, Dr. Verrill died leaving notes, prepared at long intervals and over a period during which great changes had taken place modifying the technic to be employed in determining species within the group, and, moreover, several monographs appeared by European naturalists, describing horny corals from the Caribbean Basin.

Finally all of the material which could be assembled at New Haven was returned to Cambridge and Professor Verrill's voluminous, but still fragmentary, manuscript was also turned over to the Museum. During many years attempts were made by several different persons to prepare this manuscript for publication, some of the efforts doing far more harm than good, and attempts had been made to locate Dr. Verrill's types and connect them with the figures on the immense number of plates which had from time to time most unwisely been made and printed. About 1928 it became perfectly obvious to me that most of the plates could not be used inasmuch as it was obviously inexcusable to illustrate types which could not be found and many types had been lost or had been allowed to spoil during the passage of years and some inexpert handling. There seemed but one thing to do and that was to entrust all of the material, still sufficiently well preserved as to be significant, to someone who would study the whole collection anew. Dr. Elisabeth Deichmann very kindly undertook this task and the memoir, as it now has appeared, is entirely her work. Mr. Griscom, with her help, has managed to make use of a certain number of the

printed plates in cases where it was possible to identify the figured specimens and make the necessary changes to bring the captions to accord with modern nomenclature. These two persons have devoted an immense amount of time to this project. Dr. Deichmann is to be congratulated on the completion of an extra-ordinarily complicated and difficult piece of work. Mr. Griscom has seen the manuscript through the press and looked after the innumerable editorial details which are inevitable in bringing forth a manuscript written in a language which is not the author's mother tongue. The Museum owes both these persons a real debt of gratitude.

Mr. Nelson has mounted, with his unmatched technic, a larger number of additional vertebrate fossils, now on public exhibition, than have ever been prepared in any one year. As I have said before a great deal of this material is more safely stored in a public exhibition than any other way. A class may be brought to see a specimen when it would not be safe to bring this fragile material to the class room. With the greatly increased interest in vertebrate palaeontology concomitant with Professor Romer's stimulating research and teaching, it will be necessary ultimately to devote two or three of the vacant rooms which formerly accommodated the Department of Entomology to palaeontological exhibits. The material is bulky and is difficult to organize inasmuch as, owing to the fortuitous nature of the collecting, one never knows what the next specimen to be prepared for exhibition may be. At present no funds are available to build the necessary cases in these new exhibition rooms and such funds will be one of the principal needs of the Museum during the next decade. Dr. Romer's report indicates the success of the present explorations. When this material has been studied a considerable amount will want preparation for exhibition.

In his Annual Report last year President James B. Conant made the following remarks concerning the work of the Staff of the Museum:

> "Harvard has been most fortunate in the devoted interest of its graduates. Yet probably few of them begin to comprehend the scope of the University's research activities nor the significance of the scholarly work which is proceeding under

> its auspices; nor do they realize that this distinguished record has been made possible only by the self-sacrificing and devoted services of the members of our staff. Take, for example, the Museum of Comparative Zoölogy, which for many years has operated on an extraordinarily small budget. Relatively few in the University and almost none of the alumni appreciate what we owe to the group of men there assembled who have labored, many of them almost without stipend, and given so freely of their time and energies. The spirit of the staffs of our museums is a splendid illustration of the best traditions of University life."

It is impossible for me to exaggerate the encouragement and satisfaction which this gave every worker in the Institution and it would be ungracious did I not take this opportunity to express the deep appreciation we all feel.

Reports of the several Curators indicate that this year, as every recent year, the Museum has been fortunate indeed in having innumerable generous friends and in spite of the paucity of resources our collections grow in a satisfactory manner and while many good manuscripts await publication the reports of many other worthwhile researches have been printed.

After Mr. Samuel Garman's death, at a very advanced age, the fish collection was found to be badly in need of expert care and reorganization. No key to the location of the numberless genera existed except what Garman carried in his most extraordinary memory. In 1928 Doctor Nicholas Andreevich Borodin was engaged to go over the collection and prepare a locative card catalogue. This great task has been successfully performed and the material is now easily accessible to any visitor who wishes to consult it and the picking out of specimens which other ichthyologists wish to borrow is a simple matter.

On June 1 Doctor Borodin decided to take the several months leave of absence which were due him and then to retire on account of age, to enjoy, we hope, many years of leisure in California. The Museum owes a considerable debt of gratitude to Doctor Borodin for the improved condition in which he left one of our most extensive and important research collections.

REPORT ON MARINE INVERTEBRATES

By Hubert Lyman Clark

The first three months of the year was devoted chiefly to the study of an important collection of fossil echini from Fiji made by Dr. Harry S. Ladd, and a report was prepared for publication. The study of this material was of importance in connection with my work on the Echinoderm fauna of Australia with special reference to its origin.

Beginning in November, I concentrated on the completion of the report on the Australian collections made by me in 1929 and 1932. The work was finished and the report submitted to the Director of the Museum, at the end of May. This was possible only because a liberal grant from the Milton Fund secured the services of Mr. Eugene N. Fischer to prepare the colored plates. His well-known skill and patience resulted in the production of 16 exquisite plates which deserve far more than this slight mention. The Milton Fund grant also provided for the typing of the voluminous manuscript.

As the Curator was honored with an appointment as Acting Associate Professor of Biology at Stanford University for the summer quarter, with opportunity for securing material for the Museum collections, the last two months of the year were spent in Pacific Grove, California, at the Hopkins Marine Station of that University, collecting and studying the echinoderms of Monterey Bay.

The accessions of the year have been numerous and important. Chief among these are the asteroids, ophiurans and echini of the Australian expeditions already mentioned, which Mrs. Karl M. Pattee has labelled, catalogued and incorporated in the collection with her customary care, skill and promptness. Selections from the collections have been made for sending to the Australian museums in return for their generous gifts and loans in connection with the work. Of asteroids, 3772 specimens were added to our collection including 5 genera and 46 species, not previously repre-

sented. Of Ophiurans 2725 specimens were added of which 9 genera and 56 species are new to us. Of echini 1025 specimens were added with 1 genus and 11 species new to us.

It may be of interest to record here the total result of the Australian expeditions, so far as the echinoderms are concerned. The number of specimens brought back for study was 11,484 of which we collected 9,647, while 955 were gifts, 700 were loaned and 182 were purchased. The number of species represented is 422 of which 126 were new to science while 175 were new to our collection.

Aside from the Australian material, the chief addition of the year is a very useful series of 89 specimens of 18 species from Cat Island, Bahamas, collected by Mr. W. J. Clench. The Poey Museum of Havana and Professors W. K. Fisher, S. F. Light, G. E. MacGinitie, A. S. Pearse and Jay F. W. Pearson have contributed a number of valuable echini and ophiurans from Cuba, California and Florida, in return for identifications. Some very desirable holothurians have come in exchange from the British and Stockholm Museums. Other material has been received with thanks from Messrs. J. A. and A. W. Cheever, Dr. Hayato Ikeda, Mr. W. J. Kimber and Mr. Henry D. Russell.

REPORT ON OCEANOGRAPHY

By Henry B. Bigelow

As in past years, oceanographic activities of the Museum have been chiefly in cooperation with the Woods Hole Oceanographic Institution.

In July, Mr. Stetson, on a cruise to Georges Bank on "Atlantis," continued work on the geology of the submarine canyons. The dredging was more detailed than on the two previous cruises and several additional fossiliferous formations were encountered which tend to support previous conclusions, as well as giving a clearer picture of the problem as a whole. For the purpose of ascertaining whether or not present day currents are of importance in cutting and keeping open these canyons, a current meter was adapted for taking measurements at the bottom, and readings were obtained from buoyed stations in two canyons of Georges Bank, and on the shelf beyond their rims. An anchor station through a complete tidal cycle was also made on the shelf south of Block Island to learn the magnitude of the velocities of tidal currents on the bottom and their capacity to move sediment.

Mr. Stetson's joint report with Doctors Stephenson and Cushman on the previous work on Georges Bank was published, likewise a report on the preliminary work on the southern canyons.

In October, Messrs. Stetson and Iselin made a short trip to assist Dr. Maurice Ewing in adapting to use on "Atlantis" the seismograph which he subsequently employed in ascertaining the thickness of the sediments on the continental shelf off Cape Henry.

Mr. Iselin's report on the circulation of the western North Atlantic is now in press, and he has begun a more detailed study of the fluctuations of the waters between the edge of the continental shelf and the Gulf Stream. In this connection, two surveys of the eastern slope water area were completed by the "Atlantis" during the year. During the winter, he gave a course of lectures in physical oceanography at the Massachusetts Institute of Technology, and, as it is planned to repeat this course every second year, he has been

appointed to the staff of the Institute. During September, he plans to attend the Edinburgh Assembly of the International Union of Geodesy and Geophysics.

Mr. William C. Schroeder has continued his study of codfish migrations and populations with special reference to the amount of intermigration that takes place between the northern and southern part of the Gulf of Maine, and between the different fishing banks. The experiment on rate of growth of the scales of the cod in relation to body length of fish kept in different temperatures was temporarily discontinued because of mechanical difficulties, but is to be resumed in the autumn as soon as a new stock of fish can be obtained. Work was continued on the account of the Canadian-Atlantic bony fishes mentioned in last year's report and some attention was paid to a collection of fishes taken by the Bureau of Fisheries steamers "Halcyon" and "Albatross II" and on "Atlantis" during the past twelve years.

Further field work on the study of vertical distribution of plankton in the Atlantic basin awaits completion of Mr. Benjamin B. Leavitt's report on the material already collected; but technical improvements were made during the summer in the horizontal closing nets.

The ice observation officer of the International Ice Patrol Service, Lt. G. van A. Graves, prepared his report on the Patrol of 1935 while stationed at the Museum during the autumn and winter. He went to sea in March, and after the expiration of the 1936 Patrol, made a cruise in the Labrador Sea, returning to Woods Hole in July.

The sorting of the siphonophores of the "Dana" Expedition, mentioned in my last report, was continued at the Marinbiologisk Laboratorium in Copenhagen throughout the year by two assistants, under the direction of Dr. Anton F. Bruun, and a second grant was received for this purpose from the Milton Fund for the fiscal year 1936-1937. A large shipment is expected at the Museum during the coming autumn.

The report on the siphonophores of the "Thor" Expedition, prepared in cooperation with Dr. Mary Sears, is now in press: some time was devoted to study of the hydromedusae of the "Arcturus" Expedition; and Dr. Sears has continued work on her report on the

plankton of the continental slope waters, referred to in previous reports.

My summer was spent in Woods Hole at the Oceanographic Institution, except for a cruise in August on "Atlantis" in the Gulf of Maine, investigating the fauna of muddy bottoms in deep water, especially the quantitative distribution of fishes and of the shrimp *Pandalus borealis*. Dr. Johan Hjort, visiting the Institution preparatory to attendance at the Harvard Tercentenary Celebration, also took part in this cruise.

REPORT ON ENTOMOLOGY

By Nathan Banks

Accessions: The more important additions during the past year have come from collecting trips and from purchases. Doctor Darlington spent five months in Cuba, much of the time in the mountains of the eastern part, and obtained thousands of specimens, as yet uncounted.

Professor C. T. Brues presented the Coleoptera taken during his 1935 summer trip in the west, and also some Dytiscidae.

Mr. D. Davenport gave about 1000 insects taken in Labella Co., Canada, and about 250 butterflies from Colorado.

Mr. J. A. Griswold made a small collection of insects in Panama. Messrs. J. C. Greenway, W. J. Clench, and others took various species, mostly Lepidoptera, in the Bahamas. Mr. C. M. Pomerat over 500 specimens from the Caribbean area. Mr. E. M. Davis a small lot of Florida insects; Miss E. B. Bryant some from Jasper Park, Canada, Mr. C. H. Paige various insects from New Hampshire. Professor C. T. Brues, Doctor F. M. Carpenter and Mr. C. T. Parsons were away during a few months at the end of the year in northern Manitoba primarily for amber, but obtained a considerable amount of recent insects, as yet not unpacked.

For other gifts we are indebted to Professor T. D. A. Cockerell for a few insects from British Guiana, and for a number of named exotic bees, including cotypes of some species; to Dr. J. Bequaert for various flies and about 1000 other insects and some Chilean spiders; to Mr. H. Loomes for paratypes of Haitian myriopods; to Mr. W. S. Blatchley for 200 flies from extreme southern Florida, to the University of Michigan (through Mrs. L. K. Gloyd) for twenty Odonata, including paratypes of two species; to Professor R. C. Smith for several Chrysopidae; to Mr. W. T. Davis for some Cicadas new to our collection, and to the Tropical Plant Research Foundation for several thousand Cuban insects, many named.

Mrs. E. Bartlett sent a few spiders and insects from Puerto

Rico. Miss H. Exline gave us some desirable spiders from Washington, and Robert Goslin about 800 Panorpidae from Ohio.

For desirable specimens of Coleoptera we thank Miss E. W. Mank, and Messrs. J. W. Angell, A. Bierig, S. T. Danforth, R. Dow, C. A. Frost, P. N. Musgrave, J. G. Myers, C. T. Parsons, L. C. Scaramuzza and C. T. Ramsden.

The material purchased includes a lot of miscellaneous insects and arachnids (many of them very small) taken by Mr. N. A. Weber in Trinidad and Venezuela; from J. L. Gressitt, 1360 Orthoptera from Formosa and Hainan, 240 Neuroptera and Psammocharidae, 1300 spiders, and several hundred ants from the island of Hainan: from P. S. Nathan 180 Neuroptera from Southern India; from Major J. E. Drysdale 200 specimens of especially fine Diptera and Hymenoptera from Jamaica; and from W. Heron a small lot of Coleoptera from eastern New Guinea. A friend purchased a pair of the fine *Ornithoptera titan.*

Some Neuroptera and Diptera were purchased from Karl Duncan of Arizona, and beetles from the Pacific Coast Biological Survey, and from A. Schulze several hundred beetles from Paraguay.

Material studied: Professor Brues has finished and published his large paper on the Phoridae of the Philippines, describing over 75 new species.

Doctor Darlington has worked on additional Carabidae of the West Indies, adding numerous new species, and revised two genera of that family. Doctor Bates revised a genus (Callisto) of Antillean butterflies, before he left in November.

Mr. F. Hull has identified the various exotic Syrphidae, describing some new forms, and rearranged parts of the American collection. Professor W. T. Forbes has studied and prepared a paper on the collections of Euchromidae, Noliidae, Arctiidae, and Lithosiidae of Central America, largely from Barro Colorado Island.

Doctor Wheeler has worked on several genera of ants and much miscellaneous exotic material. Mr. M. James has identified various neotropical Stratiomyiidae; and Mr. W. T. Davis identified many Cicadidae.

I have worked on various American and exotic Neuropteroids, and described a number of species. The Trichoptera sent by Dr. Horn have been studied and a paper prepared on the new species.

Additional material for study has been received from the Selangor Museum, and studied preparatory to a third paper on the Neuroptera of Malacca.

Neuroptera and Psammocharidae were named for Professor E. H. Strickland of Edmonton, Alberta; Myrmeleonidae for Dr. Lieftinck of Java, and Trichoptera for the Ohio State University Museum.

Miss Bryant has identified and described more Cuban spiders and has worked over much material from Texas and Arizona sent for determination and retained desirable specimens for the collection.

M. A. Théry has returned the large collection of Old World Buprestidae named, describing some new species; Mrs. Doris Blake, Mr. W. J. Brown, Professor H. C. Fall, R. Manitza and J. A. G. Rehn have aided in determinations.

Arrangement: The Curator has assorted into vials the microinsects and arachnids taken by Bates and Fairchild with a Berlese trap in Cuba, and those collected by Weber in Trinidad. The several thousand duplicates of Johnson Diptera have been labelled and assorted into boxes. The duplicate Chrysomelidae of Bowditch have been concentrated in one series of boxes. Flies in glycerine from the Thaxter collection have been gone over and many mounted.

The great number of mixed Lepidoptera has been arranged according to geographic regions and put in standard boxes, and the duplicate American Lepidoptera concentrated. The miscellaneous insects given last year by Graham Fairchild have been mounted, labelled, and arranged in the collection.

The European Noctuidae and allied moths were transferred from the Scudder cabinet to a Cassino cabinet and placed in the Lepidoptera room; the Scudder boxes thus vacated were used for European Neuroptera, and the standard boxes thus emptied used for extending the Neuroptera, Diptera, and Hemiptera where these were crowded.

Doctor Darlington has continued the arrangement of the West Indian Coleoptera, and certain other parts of the collection.

Doctor Bates, while here, assorted part of the Central American Lepidoptera, and also some of the Oriental butterflies.

Students and other help: One student was engaged the entire year in mounting and spreading Lepidoptera; the Barro Colorado material was finished, also the Bleaser Brazilian material and several small lots. Miss Bartlett has completed mounting the Oriental material collected by Doctor Barbour thirty years ago, and assisted in labelling, and transferring. One student has helped Doctor Darlington, mostly pinning, labelling and fumigating.

Another has prepared the double trays for use, labelled specimens and fumigated collections.

Mr. Sydney Williams, an ardent amateur, has been a great help to Doctor Darlington in mounting and labelling Coleoptera; he has assembled the Cleridae and Lampyridae preparatory to a rearrangement, and distributed much material. He has also assorted the African Coleoptera, remounting many specimens. He has the warmest thanks of the whole Museum staff.

Exchanges: From the University Museum of Copenhagen we obtained 50 species of Danish spiders. From the Canadian National Museum we acquired paratypes of 49 Lepidoptera and 8 Ephemeridae.

Equipment: Two hundred and twenty-five new boxes have been received and utilized; over 1000 vials added, and 200 double trays for vials.

Visitors: Visitors to study the collection, besides numerous visits of Mr. Fall, include D. Dunavan (Haliplidae), Mrs. L. K. Gloyd (Odonata), Z. P. Metcalf (Fulgoridae), J. A. G. Rehn and son (Orthoptera) and J. M. Valentine (Carabidae).

Types: The number of types now marked stands at 22,371.

REPORT ON THE MAMMALS

By G. M. Allen

From various sources, many very acceptable specimens have come in during the year past. Of these, some of the most notable are:— a collection of about one hundred South African mammals, large and small, in exchange with the Transvaal Museum as well as a number of skins and skulls from the Transvaal and Mozambique, presented by Dr. Thomas Barbour, giving a much needed representation of certain species of this region; a well-prepared series of over 130 small mammals collected by Mr. J. A. Griswold, Jr., in the Canal Zone, including a number of rarer bats, two genera of which are new to the collection; 35 well-made skins from Wyoming collected and presented by Mr. Carl P. Lyman, besides 22 more presented by Miss Barbara Lawrence and Mrs. Andrew Marshall, Jr. from the same State; a number of bats in alcohol collected by the Bahama expedition of Messrs. Clench, Russell, and Huntington last summer; a fine skin and skull of Cowan's Sheep and a number of trapper's skulls from the Yukon sent by Mr. J. W. Hayden through the kind offices of Mr. H. J. Coolidge, Jr., and H. Bradford Washburn, Jr. In addition the following gifts are gratefully acknowledged:— several Bornean specimens from Mr. King Chapman; a series of Bulldog Bats (Noctillo) in formalin, from Dr. Herbert C. Clark; skulls of Ctenomys and antlers of a South American Deer from Dr. Carlton S. Coon; several skulls of New England mammals and birds from Mrs. Edward S. Dodge; five Brazilian bats (Tadarida) from the Field Museum of Natural History; a skin and jaws of the Maned Wolf from Mr. J. D. Flemming; the skull of a Striped Porpoise from Mr. Frank Firth of the Bureau of Fisheries; a Bahama Raccoon from Mr. James Greenway; skull of a Virginia Deer from Mr. J. A. Griswold, Jr.; a series of skulls of Brazilian armadillos and anteaters from Dr. G. W. D. Hamlett; various mammal skulls from the Museum of the Harvard Dental School; two British Dormice from Miss Gertrude Hooper; the cape and antlers of a Marsh Deer, skins of a Tayra and a

Howler Monkey from Mr. J. K. Howard; three Chinese bats, including the rare genus Rickettia (new to the collection) from Dr. C. C. Liu; an American Bison skull from Rev. R. T. Loesch; skulls of Philippine Deer and Tamarao from Mr. Pedro de Mesa; a specimen of Jackson's Scaly-tailed Flying Squirrel from Dr. R. B. Michener, through Mr. A. Loveridge; several small mammals of local species, from Mr. J. L Peters; a skeleton of a mangabey from Mr. George Schwab; the skeleton of a Saluke Dog from Mrs. Evelyn Southwick; skulls of an American Tapir and Sika Deer from Dr. George Wislocki.

Through the kindness of its Director, Mr. Donald Scott, the Peabody Museum has transferred to the department as a permanent loan a number of skulls of Indian Dogs from various sites in the southern United States, adding materially to our now extensive series representing breeds of domestic dogs. In addition there have been added by purchase a specimen of the California Mule Deer, two Syrian Squirrels and four Ecuadorean mammals. In all, over five hundred accessions have been catalogued during the year.

By exchange, sundry desirable species have been obtained from the following:— Mr. H. H. Bailey, through Mr. Peters, a number of British and North American skins and skulls; Mr. B. Patterson Bole, of the Cleveland Museum of Natural History, topotypes of a recently described race of Kangaroo Rat (*Dipodomys merriami frenatus*); Boston Society of Natural History, topotypes of Rhoads' Red-backed Mouse; Carnegie Museum, several West African bats; Field Museum of Natural History, a bat of a genus, Leptonycteris, not previously in the collection; Mr. M. M. Green, topotypes of the mouse-hare, *Ochotona jewetti;* Kaffrarian Museum, through Dr. Barbour, several skins and skulls of South African antelopes; Prof. S. J. Ognev of Moscow, four specimens, including three races of the Siberian Flying Squirrel; Transvaal Museum, through Dr. Barbour, specimens as noted above; Museum of Vertebrate Zoology of the University of California, western races of Peromyscus not previously in the collection; and the University of Kansas Bird and Mammal Museum, specimens of the newly described race, *bunkeri*, of the Cave Bat, Antrozous.

Of the larger skins received, about one hundred have been

tanned, bringing nearly to date the preparation of such specimens. The care and preparation of all this material and of previous accumulations could not have been kept up to date without the devoted and skillful assistance of Miss Barbara Lawrence who has taken charge of the cataloguing, besides doing a large part of the labelling and preparation of small skulls. With the help of Miss Lee McKean (now Mrs. Andrew Marshall, Jr.), who has most generously given her services during the greater part of the year, she has also completed the re-arrangement of the entire collection of smaller skins, spacing out, transferring some of the crowded groups to the new cases built last year, and preparing neatly typed labels for the individual trays as well as for the separate cases, all of which adds greatly to the appearance and availability of the collection. The addition of much new material in recent years has made necessary a respacing and re-labelling of the skeletal material, a task which we already have well under way. The collection of mammals in alcohol has also been gone over once more, and reduced to the lowest possible terms. Some of the older specimens have been discarded, a few of the better preserved have been kept to represent interesting genera, and much of the remainder has been sent to Ward's of Rochester to be prepared as skeletons.

Under Mrs. Marshall's dextrous fingers, a large number of roughly made field skins have been softened out, skulls removed and cleaned, and the skins made up neatly in modern style, greatly to their improvement in appearance and value. She has also continued the work begun last year of making a collection of photographic representations of mammals, clipping and mounting on cards of uniform size illustrations and photographs from various sources. For many of the larger mammals such pictures become of much value in supplementing the preserved skins or bony parts. For her help in these and many other ways, thus generously given, the department is deeply grateful.

During the college term we have had the assistance of a student, Mr. Coyle, on part time. He has helped with card-cataloguing the specimens, bringing this work nearly to date; he has also arranged in pamphlet boxes the large number of separates which form an important part of our equipment, and has been of much assistance in respacing and relabelling the osteological collection.

The Curator, in addition to routine matters, and the identification of specimens as they have come in, has continued work toward a monograph of the small bats of the genus Pipistrellus; has completed the study of the bat collection loaned by the Indian Museum: and has prepared a check-list of African Mammals.

The Assistant Curator, Mr. Coolidge, has continued his studies on the Anthropoid Apes. In this connection he has cooperated with Professor Yerkes in developing a method for recording coat and skin characters in relation to growth, development, age, nutritional status and pathology in the Chimpanzee colony of the Yale Laboratories of Primate Biology, and has prepared a report on the Gorilla material obtained by the Vanderbilt Expedition of the Academy of Natural Sciences in Philadelphia.

In the care of the collections his attention has been largely devoted to the mammals on exhibition and the skins in the hide room. He has devoted part of his time to his duties as secretary of the American Committee for International Wild Life Protection which carries on a wide correspondence with foreign countries. This Committee has published two reports in the past year:— "Notes on South African Wild Life Conservation Parks and Reserves" by Thomas Barbour and Margaret Porter, and the translation of a report on "Nature Protection in the Netherlands Indies." The Committee is now engaged in preparing a check-list of rare and recently extinct mammals of the world. A considerable amount of his time has been devoted to running the Harvard Film Service which now has a staff of eight and is becoming increasingly active. As photographic director of the Tercentenary Celebration he has had to lay aside his research and give increasing time to this special assignment. He is also organizing an expedition to Siam and North Borneo for 1937 with a view to making special collections and field studies of primates, and general collections of birds and mammals for the Museum.

Miss Lawrence, in addition to other activities, has made some preliminary study of the relationships of the Hawaiian and other rats, and has helped in the re-identification of certain primates.

It has been a pleasure to cooperate with the Peabody Museum through the identification of mammalian bones excavated in the course of various archaeological investigations, and similar work

has been done for Dr. E. B. Sayles in charge of archaeological studies in the Southwest. In this the helpful assistance of Miss Lawrence is gladly acknowledged. A small series of bones of some species has been retained for the collection.

Four graduate students have utilized the collections in connection with special studies in advanced courses. Material has also been loaned to six outside institutions.

REPORT ON THE BIRDS

By James L. Peters

The total number of accessions for the year amounted to 1,621 skins, the smallest number since 1918–19 when only 583 bird skins were added. The receipts fall into the following catagories: received in exchange 864; Museum expeditions 163; purchases 301; gifts 293. Compared with the 1934–35 figures the exchanges show a large increase, purchases a drop of about 25 percent and expeditions and donations a heavy falling off.

Mr. Griswold was in Panama for four months from the end of December, bringing back 65 birds; Mr. Greenway returned the latter part of May after spending a little less than four months in the Bahama Islands conducting field studies of certain endemic forms; during this time he collected 98 birds.

The largest single gift was that of 253 skins of South African birds purchased by Dr. Barbour during his visit to the Transvaal and presented by him upon his return. Through the interest of Mr. J. A. Jeffries, Mrs. J. Sumner Draper presented two skins of Heath Hens. The San Diego Natural History Society gave three pairs of *Junco o. pontilis*. Single specimens or small lots were donated by O. L. Austin, Jr., The Boston Zoo, Thomas Barbour, Douglas Byers, King Chapman, Haskett Derby, Barbara Lawrence, George Nelson, J. L. Peters and B. Stoddard.

Two small collections were purchased from Oscar Neumann of Berlin, one of 97 birds collected by Menden on the Pagi Islands off the southwest coast of Sumatra and one of 160 birds assembled by Uhlenhuth at Dire Daua, Ethiopia.

The Museum's list of generic and specific desiderata of birds is still based chiefly on Sharpe's Hand-list; we have been able to cross off 2 genera (Urolais and Physocorax) and 87 specific desiderata from the list of that excellent but out-of-date authority. It is my intention to prepare as soon as possible a list that will give a more modern aspect of the actual generic and specific gaps in the collection. Such a list would consist first of a generic section to

include all of the currently recognized genera still lacking at Harvard; many have been named since Sharpe's hand-list appeared. A second section would contain only the recognized species of which we have no representatives at all. A third section to contain only subspecies, would be the most difficult and time-consuming to prepare and would also eventually prove of the least value.

The activities of the members of the department staff show little change from last year. The larger incoming collections are worked up by Mr. Griscom and by Mr. Greenway. The latter is also engaged in preparing a survey of the extinct birds of the world and reviewing the results of his last winter's trip. Mr. Griswold continues to relieve us of much routine and curatorial detail and Miss Porter takes charge of all labelling, cataloguing and card index work.

I have completed the third volume of my check-list which is now in press and have made a good beginning on the fourth. Thanks to a special grant I was enabled to attend the XII International Zoological Congress held at Lisbon, Portugal last September, as a delegate of the United States and of Harvard University, as well as in my capacity as a member of the International Commission on Zoological Nomenclature.

While the number of persons or institutions applying for the loan of material decreased from nineteen to fourteen, the number of loans increased slightly, from twenty-nine to thirty-one, and the amount of material loaned jumped from 655 specimens to 843.

The total number of 8,203 birds was entered in the card catalogue bringing the number now carded to 102,866.

No improvement is noted in the crowded condition of the collection, lack of available funds having prevented the construction of new cases. Only the comparatively small amount of the year's accessions has prevented the problem from reaching an even more acute stage.

The collection is reaching a point where large, original field collections from the principal continental areas (except from carefully chosen regions) will, to a great extent, duplicate material already possessed, and furthermore seriously overcrowd cases that have practically reached their limit in this respect. The need,

therefore, is not for more general field work, in such areas, but for a selective system of acquiring material which will complement and not duplicate. The two chief methods of accomplishing this end are by exchange and purchase, but both methods are slow, since the desiderata of this collection are to a great extent rarities, the desiderata of other institutions as well. The few dealers in natural history specimens seldom come into possession of very desirable material.

The collection has always been weak in the resident birds of India and the Indochinese countries, and certain of the Indo-Malayan Islands. There is every prospect that the filling in of some of these important gaps will commence shortly. A considerable amount of new material from Australia, New Guinea, the Moluccas, Celebes and the Lesser Sunda Islands could also be used to great advantage.

During the past twenty-five years the total accession for the bird collection amount to 188,035 skins. The yearly increments may be divided into five categories, purchases, exchanges, museum expeditions, small collections presented and large collections either presented or received by bequest. Purchases and exchanges are clearly cut and defined; but the line between museum expeditions, small collections presented and in some cases the presentation of larger collections as well, is not a hard and fast one, for often expeditions have been financed by friends and the resulting collections, large or small, have been recorded as donations. Bearing in mind that no sharp distinction can be drawn in all cases, the accessions for the years 1909–10 — 1934–35 inclusive may be divided as follows:

Museum expeditions	7009
Purchase	7079
Exchange	6692
Gift (small collections)	46292
Gift or bequest (large collections)	120963

Some rather interesting conclusions may be drawn from a study of these figures. Practically all the large collections in private hands, destined for the Museum of Comparative Zoölogy, have been received and this largest source of material is practically exhausted. As already explained in this report, exchanges while

extremely important, are a rather uncertain element of our yearly growth. The major part of the new material required to show a healthy annual increase of the bird collection must therefore be derived from two sources, viz: direct purchase from museum funds, or from cash subscriptions by friends of the Museum to be used for the purchase of small but important collections or for original field work in critical regions.

REPORT ON OOLOGY

By Richard C. Harlow

The study collection of Bird's Nests and Eggs is especially strong and comprehensive in its North American representation. The basis of the collection consists largely of the William Brewster and the John E. Thayer collections. The Thayer collection especially is probably most complete in regard to species represented of any North American collection in the world.

There is also much valuable early material from a historical standpoint in eggs taken by many of our earlier naturalists as well as numerous type sets.

The Brewster collection is very valuable in New England study material.

There still remains much to be done along the lines of foreign representation but the basis exists for further expansion in much study material from South America, Europe and Africa.

The Museum has also some splendid series of rare Mexican eggs taken by W. W. Brown.

A card index, by species, forms a ready guide to the study material, and the collection on the fifth floor is readily available for the use of properly qualified persons wishing to consult it.

REPORT ON THE MOLLUSKS

By William J. Clench

Expeditions.— Through the kindness of several friends of the Museum, the cooperation of the Academy of Natural Sciences, Philadelphia and the Museum of Zoology, University of Michigan, two trips were made possible to the Bahama Islands. The first expedition, during July and August 1935, was made to Cat Island with H. D. Russell, J. H. Huntington and the Curator. Studies were made of the distribution of local races of Cerion within a limited territory as well as a general survey of the fauna of this island. The second expedition, during April and May, 1936, was to Grand Bahama, Little and Great Abaco and Eleuthera. This trip was made by Mr. J. C. Greenway and myself. Mr. Greenway's brother, Mr. Gilbert Greenway, joined the expedition for a short period of time and used his seaplane to aid us in reaching many small islands not readily available by boat without much loss of time. Birds, reptiles, mollusks and insects were collected at as many stations as possible from the several islands mentioned above.

Collections.— Through the great kindness of Dr. P. J. Bermudez we received his collection of Cuban land and freshwater mollusks. This collection comprises approximately 7000 lots, and was collected mainly during the past eight years throughout the island. It is particularly rich in species of Urocoptidae, a family remarkable for the vast number of species developed on the island. This collection, coupled with our own, makes possible a more detailed study of the fauna of this area than of any other part of the world. In addition to the above, a collection of about 1000 lots of marine mollusks was also donated.

Several other very important gifts were made that have added materially to the collections. Exchanges, as in past years, have continued with many individuals and museums in various parts of the world; the most important single exchange being with Dr. T. van Benthem Jutting of the Zoologisch Museum, Amsterdam. A series of the "Siboga" duplicates is being thus received.

Routine work still continues to occupy a considerable portion of time, but I have been relieved of much of this during the past year by Mr. Richard McLean who entered upon his duties as Research Assistant last September.

Dr. Bequaert and I have continued the work on African mollusks. A few papers have been finished and published and two are now in press. Our geographic catalogue of all African mollusks in the Museum of Comparative Zoölogy has been completed.

Mr. McLean has continued his work on the marine bivalves with several genera now completely revised and also his research work on the West Indian bivalve fauna. Two papers on the Bahamas has been published, two more are now ready for press.

Mr. W. F. Clapp, who donated his very large collection of Teridinidae several years ago, has very kindly offered to have the collection catalogued at his own expense. More than 2500 lots were entered during the year.

My own research during the past year has been mainly on land mollusks of the Bahamas. The first report on Cat Island is now ready for press and the second report covering the islands on the Little Bahama Bank and Eleuthera is well underway.

Miss Chippendale continues to do excellent work on cataloguing the material as it is received, as well as many other useful clerical tasks.

Both Barker and Merriam, our student assistants, accomplished a vast amount of work during the college year and have made possible the cleaning up of several tasks that never would have been done without their aid.

As in past years, I am grateful indeed for the volunteer work done by A. Archer, G. Banks, P. Bermudez and A. Cheever.

A resumé of the collection follows:

Number of accessions for the year	11069
Catalogued entries in the collection	97935
Number of species in the collection	23505

REPORT OF THE RESEARCH CURATOR OF ZOOLOGY

By Ludlow Griscom

The financial year of the Museum was in no way different from the preceding year, so that this function took less time than perhaps ever before. The preparation of the budget was as nearly automatic as possible. The only change involved was the initiation of the University annuity system, resulting in a further charge against the Museum's income. Fortunately this could be met by a saving in declared expenses in other directions. When the Museum's income was first drastically reduced, the new budget of necessity contained pure estimates only of the minimum possible sums required to maintain the Museum's collections under various headings. Two years practical experience, with careful study and analysis of expenditure, showed that some additional saving could be made, and fortunately this saving balanced the increase in expenditure under the annuity system. It was consequently possible to conclude the financial year once more with a substantial saving, under the deficit allowed.

This was not accomplished, however, without notably decreasing the balances in our two special funds, available for any purpose whatever. One consisting of gifts from friends and the other being the receipts from the sale of our publications, it is impossible to predict in advance what a year's accretions to these funds may be. Here for a second time more fortunately, the Museum sold a complete set of Memoirs and a complete set of its Bulletins, and this unexpected stroke of fortune almost equals the inroads made on the balance in our Special Publication Receipts fund.

It should consequently be clear how close into the financial wind the Museum ship is sailing. Indeed it could almost be regarded as unfortunate that the Museum has not incurred its allowed deficit for three years, just because it is almost impossible to avoid the presumption that competent management will enable it to continue so to do indefinitely. I have tried to show that it was done last year chiefly because of two fortunate events.

The outstanding event as regards the Museum's publications was the appearance of Miss Deichmann's memoir on the Blake Alcyonarians. This was the last of the unfinished reports on the Blake and Albatross expeditions, which the present officers of the Museum inherited from the preceding regime. It is indeed a satisfaction to feel that hereafter our publication funds can be used for the prompt appearance of the scientific reports on our rapidly growing collections prepared by an active staff, and that they no longer have to be mortgaged years in advance for the printing of reports on collections acquired many decades ago. The editorial work involved in the printing of this memoir was, however, very considerable. As a matter of fact more time was spent on the Museum publications than in any preceding year.

The greater part of the time allotted to research work was devoted to writing a monograph on the Crossbills of the world, now in press. During the fall specimens for study kept coming in from all over the United States. In the spring the installation of the Rothschild collection in New York made possible the study of their great series of the Old World races, and the final writing of the report took nearly two months. In the fall Mr. Greenway and I completed our list and bibliography of the avifauna of the Lower Amazon. It remains to prepare a brief faunal analysis and to determine whether we can use the Klages collection at Pittsburg for further unpublished data and records.

The month of March was spent travelling in Jamaica engaged in various types of natural history work. Special attention was devoted to the status and relative numbers of the resident birds. As opportunity offered, some eighty lots of land shells were collected for the Museum, in the hope that even an utterly ignorant amateur might pick up something of value. Mr. Frank W. Hunnewell and I also collected several hundred numbers of plants for the Gray Herbarium, particularly from the summit of Blue Mountain and the wild Mt. Diablo range. Mr. Hunnewell has now completed the identification of this material which includes a gratifying number of endemic species previously unrepresented in the Gray Herbarium, or represented by exceedingly poor and fragmentary material.

My summer school field course in ornithology was offered a

second time. Active local field work and contact with local bird and conservation organizations were continued. The year 1936 will vie with 1935 in the abundance and variety of birdlife in this State and several specimens of interest for the New England Collection of the Boston Society of Natural History, were secured. Beginning with the new year (1936), I undertook a bimonthly review of the bird-life of the State for Bird-Lore, at the request of the editor.

REPORT ON THE REPTILES AND AMPHIBIANS

By A. Loveridge

During the past year 4,600 accessions were entered in the departmental catalogues as against 4,000 during the previous year. There was a gain in genera new to the collection but a considerable falling off in species. The average annual gain during the past decade has been 11 genera and 143 species, while for the year under review the figures are 12 genera and 91 species.

The reports on the Vanderbilt-African Expedition of the Academy of Natural Science of Philadelphia, as well as that on the reptiles resulting from my last visit to Uganda and Kenya were completed. In addition the report on the whole of the amphibian material of my 1933–1934 journey was written and is now in press. Ten other papers written or published during the year appear in the bibliography.

My colleague, Mr. Benjamin Shreve, has not only kept abreast with the identification of the numerous new world collections received during the year, but has described a number of new forms from Cuba, Haiti, Panama and Colombia.

We were most fortunate in having the help of an exceptionally active and industrious student aid. Not only did he tag the majority of the 4,600 accessions, but by a special effort, largely caught up with the arrears of replenishing with alcohol; completing the lizard collection and going over three-quarters of the jars of snakes.

Museum Expeditions accounted for 1,214 catalogued specimens. These include a valuable amount of material from little-known Bahaman cays collected by Messrs W. J. Clench and J. C. Greenway. A small but interesting series brought back from the Canal Zone by J. A. Griswold. The balance of Dr. P. J. Darlington's Haitian collection. Dr. T. Barbour's Transvaal collection, and the amphibia resulting from the curator's visit to Uganda and Kenya in 1933–34.

Undoubtedly the most important single addition received during the year was a portion of the Malcolm A. Smith collection of Orien-

tal lizards which were presented by a friend of the department. Our share of this collection consisted of 394 specimens, representing 75 species of which no fewer than 27 were unrepresented in the Museum of Comparative Zoölogy. From the same donor came desiderata from the four quarters of the globe, including sixty odd specimens from Southwest Africa, 250 amphibia of North America collected by Mr. B. B. Brandt, a further lot of Honduranian material from R. E. Stadelman, in addition to smaller items from the Orient.

Eighteen individuals and four institutions presented smaller lots. We take this opportunity of expressing our appreciation for these welcome gifts to Mrs. R. Stohler and Messrs. C. T. Brues, S. C. Bruner, A. F. Butler, K. Chapman, T. T. Chen, S. T. Danforth, S. F. Hildebrand, J. K. Howard, C. V. MacCoy, W. Mosauer, G. Nelson, C. R. S. Pitman, C. M. Pomerat, J. H. Power, R. E. Stadelman and H. J. A. Turner. From the Australian Museum were received a series of geckos (*Diplodactylus tessellatus*), the Madras Museum sent four chameleons, the East African Agricultural Research Station seventeen rarities including the unique lizard (*Bedriagaia moreaui*) while the Instituto Butantan augmented our collection of Brazilian snakes by eighty additional specimens.

Sixteen loans were made to nine museums. Exchanges were arranged with eighteen institutions and resulted in 671 additions, chiefly from regions inadequately represented in our collections but not producing a very high number of forms new to the museum.

The annual census of the collection follows:

	Genera	*Species*	*Gain Genera*	*Gain Species*
Rhynchocephalia.	1	1	0	0
Crocodilia.....	8	24	0	1
Chelonia.....	61	204	0	1
Lacertilia.....	289	2,148	6	60
Ophidia.....	305	1,505	5	14
Amphibia.....	222	1,549	1	15
Totals.....	886	5,431	12	91

REPORT ON INVERTEBRATE PALEONTOLOGY

By P. E. Raymond

During the year both the Curator and Mr. W. E. Schevill lost a good deal of time because of illness. Such work as they were able to do was in the nature of ordinary routine curatorial work, which had accumulated while they were out, leaving scarcely any opportunity for research.

Dr. Carpenter has been active in the field, having spent September, October, and November in Kansas continuing the collection of Permian insects at Elmo; this trip was financed with the help of the American Academy of Arts and Sciences and the Geological Society of America. About two thousand specimens were secured, giving the Museum a total of approximately 8000 from this formation. The new material has been sorted into major groups, and Dr. Carpenter has finished a manuscript on certain of the orders included. He has also nearly completed the study of the Miocene insects obtained at Creede, Colorado, in 1934; a small grant from the Milton Fund has aided in defraying the cost of illustrations.

Graduate students have continued to work in the collections. Dr. Vladimir J. Okulitch, of the Royal Ontario Museum, Toronto, has carried on his studies on the corals, making many thin sections. He also collaborated with the Curator in a study of Chazy an sponges, and with Dr. C. C. Albritton, Jr., described a Permian coral from Texas. Dr. Fred B Phleger completed his revision of the Lichadidae, as well as another manuscript describing a number of new forms in our collections. Dr. Claude C. Albritton, Jr. described the ammonites of the Malone Jurassic of Texas, and generously presented his types to the Museum; these, with the small but exquisite series of Nostoceras he donated last year, make a notable addition to our cephalopod series.

In much of the routine work on the cephalopods, Mr. Schevill has been fortunate in having the diligent and willing assistance of John J. Frankevicz, '36. During the past three winters he has worked in the department, and without his capable cooperation

the revision of the cephalopod catalogue would have been much delayed. During Mr. Schevill's illness he carried on the work so that no time was lost from this task. It is with great regret that we lose him this year.

In addition to his regular duties Mr. Schevill has begun devoting half his time to work in the Museum library.

Accessions:

By donation from: Messrs. Pedro J. Bermudez, Thomas Barbour, Henry Seton, W. F. Jenks, Victor Van Straelen, Kirk Bryan, Claude C. Albritton, Jr., and Robert Sharp.

By exchange from: Maxwell Smith, Esq. (transfer from Department of Mollusks).

By purchase of: Mrs. C. P. Mason and Mr. C. M. Barber.

By collection: F. M. Carpenter.

REPORT ON VERTEBRATE PALAEONTOLOGY

By A. S. Romer

The exhibition series of fossil vertebrates has been vastly improved during the past year by a continuation of the work of remounting the mammalian skeletons, mentioned in the last report. At that time Mr. Nelson had already completed eight splendid panel mounts; during the past year *Heptodon*, *Promerycochoerus* and *Platygonus*, previously mounted in the "open" style, have been converted to panel mounts; the *Dinictus* skelton and a partial skeleton of *Oxydactylus* have been remounted, and, finally, a new panel mount has been made of a skeleton of *Merycoidodon gracilis* received in exchange from Amherst College. Except for the larger animals almost all the mammal skeletons are now mounted in uniformly excellent panel fashion and this portion of the fossil collection is exhibited to its best advantage.

Supported by a grant from the Milton Fund, Dr. T. E. White and Mr. L. I. Price sailed in January for a fossil collecting trip to southern Brazil. Rich fossil beds, mainly of Triassic age, have been reported in the region, but almost no material has been described from them except for a collection made a few years ago by Dr. von Huene of Tübingen. During the past few months they report finding a very considerable amount of good fossil material, mainly reptiles of the rhynchosaur group. At the moment work has been almost entirely suspended because of the onset of the rainy season but it is hoped that they will be able to resume their excavations shortly. Officials of the Brazilian government as well as American Diplomatic and Consular officers have been uniformly cordial and helpful and to many of these more specific thanks have been expressed.

During the 1935 field season Price and White collected a number of good specimens from the Permian of Texas, but their work was seriously hindered by heavy rains. It thus seemed advisable despite their absence in Brazil, to continue the Texas work this year. The Curator spent the month of May in Texas introducing Mr. R. V. Witter of the preparation staff to the methods of Permian

collecting. Following the writer's return, Witter was joined by several advanced students. At the time this report is closed the expedition had already proved to be a success. The group had, in particular discovered a rich, new, lone "pocket," from which, besides numerous skulls and skeletal materials of amphibians, they recovered a skeleton which appears to be that of a new type of large pelycosaurian reptile.

In 1935 Mr. Henry Seton discovered a series of new and interesting Eocene mammalian fossil localities in the upper reaches of the Wind River valley. Accompanied by Mr. Robert Denison, he is excavating in this area during the present summer.

During the past year I have been engaged on studies in pelycosaur morphology and on the crania of paleozoic fishes. Dr. White has described the great *Kronosaurus* skull and completed the manuscript of his description of the *Seymouria* skull.

The skeleton of *Coryphodon* has been freed from the matrix and has been loaned to the Field Museum for description by Mr. Bryan Patterson. The oligocene rodent material is being studied by Dr. A. E. Wood in connection with a chapter on this group to be incorporated in Dr. Scott's monograph on the White River fauna. Dr. Wood states that this collection is the best in existence from the upper portion of these beds and contains several new forms as well as a number of morphologically important specimens. We have again had the pleasure of visits from Dr. Scott. Dr. G. E. Robertson of Dartmouth has studied the ostracoderms from Öesel collected by Dr. Raymond and Mr. Schevill in 1934.

In recent years the department has made great progress in the development of its exhibitions on the one hand and, on the other, in the collection of much material of great potential value. It is in the intermediate step—preparation—that our present greatest weakness lies. No matter how good the material collected may be, it cannot be utilized for either scientific study or exhibition until a great deal of labor has been expended in freeing it from its matrix. At the present rate it will not be long before the lack of prepared material will slow down the present satisfactory growth in exhibitions; and still more serious is the fact that many specimens worthy of description will remain scientifically unknown for years because labor is lacking to prepare them.

REPORT ON HELMINTHOLOGY

By J. H. Sandground

Since the last report was submitted the catalogue of this department shows an increase of 118 accessions. While the nematodes have always been the most strongly represented group in our collection, an effective effort has more recently been made to build up a good series of Trematoda and Cestoda. The collection is preserved either in the form of mounted slides, or in vials containing a mixture of glycerol and formalin or alcohol, the better to withstand the disastrous effects of desiccation with a minimum of attention in the future.

In addition to a goodly number of new species that were collected by the curator, during the year we have received, either as gifts or by exchange, many specimens from colleagues in other institutions. Workers in Helminthology are now beginning to realize how necessary it is to distribute co-types of their new species to other museums whereby they materially reduce the hazard of valuable material being lost to science. Of such co-type material we wish to acknowledge specimens from Dr. O. R. McCoy of the University of Rochester, N. Y. and from Dr. Allen McIntosh of Washington, D. C. At the request of Professor L. Jägerskiöld we have ourselves entered into an arrangement for exchanging helminthological specimens with the Götesburg Museum in Sweden.

During the year the Curator has identified a fairly large collection of parasitic worms collected by the pathologists of the Philadelphia Zoölogical Society and has procured further material by performing post mortem examinations on animals which have died in the Franklin Park Zoo.

For hitherto unrepresented species received we wish also to acknowledge our indebtedness to Professors T. W. M. Cameron of McGill University and C. Bonne of the Geneeskundige Hoogeschool, Batavia as well as to Dr. Louis van den Berghe of the Institute of Trophical Medicine in Antwerp, Dr. E. L. Taylor of the

British Ministry of Agriculture, and Mr. F. H. S. Roberts of the Queensland Department of Agriculture in Australia.

In closing this report we must record the recent transfer of the helminthological collection back to its old quarters on the fourth floor of the museum.

REPORT ON THE FISHES

By N. A. Borodin

Type specimens.—The card catalogue includes at the present time 1237 types (5 more than in 1934–35).

New accessions.— The following small collections received: 8 species (holotypes) and 3 paratypes from Dr. L. H. Rivero; 6 from Dr. T. Barbour; 2 from Dr. Vladykov; 211 from Mr. W. Schroeder; 4 paratypes from Dr. Parr (in exchange); 1 from Woods Hole Oceanographic Institution. The Museum mailed (by request, in exchange) to the Pacific Scientific Fisheries Institution at Vladivostok, 22 common American fishes. The Institution promised to mail us paratypes of new Far Orient fishes (which are not yet received.)

Loans.— 1 mystophine fish, supposed to be a new species,— for identification to Dr. Parr; 9 lots and several cotypes of cyprinodont fishes, to Dr. C. Hubbs.

Visitors.— Dr. L. H. Rivero continued to work in Museum during the winter of 1935–36.

Research work on the Ababiosis of fishes by the curator has been the conducted at the Halifax Fisheries Laboratory. A paper about the results is in preparation.

REPORT ON THE FOSSIL ECHINODERMS

By Robert T. Jackson

Much time was spent in labelling and cataloguing the collections of fossil Echini.

During the year many noteworthy additions to the collections were received. An important accession by gift of Dr. Harry S. Ladd is two fine specimens of *Cheilonechinus suvae* Bather, paratypes, from the Neogene of Viti Levu, Fiji Islands. Details of these two specimens (orig. nos. L3 and L4) are described and figured by the late Dr. F. A. Bather in his posthumous memoir on Cheilonechinus, N. G., Bull. Geol. Soc. Amer., Vol. 45, 1934.

Dr. R. H. Palmer, of Havana, Cuba, gave a choice series of 29 species, including 91 specimens from the Upper Eocene of Cuba. This series is noteworthy from the quality of the material as well as the full details given of locality and geological horizon. A few Cretaceous Echini from Texas were received a gifts from Mr. J. B. Litsey of Dallas, Texas, and from the curator.

An excellent series of Tertiary Echini was received in exchange from Dr. Louis Castex, of Bordeaux, France. This collection includes 47 species and 141 specimens of fossil Echini from Southwest France, and in addition a few recent Echini. As a return was sent to Dr. Castex, 32 species, 124 specimens of fossil Echini from duplicates of the B. W. Arnold collection from Jamaica, also 7 species, 11 specimens from the Cretaceous of Texas, and in addition 14 species, 51 specimens of recent Echini.

Received from the Boston Society of Natural History a few crinoids and sea-stars, also a considerable number of Agassiz and Desor's casts of fossil echinoderms.

Sent to the British Museum casts of *Echinarachnius juliensis* Desor, also photographs of the type of that species which is in the Museum of Comparative Zoölogy; in addition sent casts of the type of *Monophora darwinii* Desor. Both of these species were discovered by Darwin in Patagonia. The British Museum kindly sent as a gift five casts of Louis Agassiz's types of fossil Echini that were not previously in the collections.

REPORT ON THE COELENTERATES, SPONGES AND WORMS

By E. Deichmann

The first part of the year was spent in re-arranging and re-cataloguing the older collections of lower invertebrates which gradually are coming into more workable order. In the Synoptic room the exhibition cases with Coelenterates have been re-arranged and new labels are being prepared. In September I furthermore began my work as tutor in Radcliffe College, a most pleasant addition to my other duties.

Most of the time, however, was spent in making the manuscript of the "Blake" Alcyonarians ready for press. During my visit to the British Museum in July, 1934, I was fortunate enough to find that a number of Duchassaing & Michelotti's types of West Indian Alcyonarians were still extant. This solved a number of moot questions in a very decisive manner but it also entailed no end of alteration of nomenclature in the manuscript. The latter went to press in the end of January and the monograph was published in June. Five smaller papers, dealing with Alcyonarians and Holothurians were published during the spring, one of these in collaboration with Dr. H. L. Clark.

From April 1st to August 30, I was out at Hopkins Marine Station, Pacific Grove, California, having been invited, partly to give a course in Marine Zoölogy, partly to write a synopsis of some of the local Invertebrates. The fact that I came out during the early months of the year enabled me to observe the development of some of the Echinoderms which do not breed during the summer months, and I feel very grateful indeed for having had this opportunity, thanks to the liberality of the Museum, as well as of Radcliffe College, allowing me to leave so early in the year. Besides the regular collecting work in Monterey Bay and vicinity, with numerous dredging trips made on the "Albacore," I had occasion, during the vacation period in June, to visit Los Angeles. Here I spent a week working on the Holothuriana, collected by the Han-

cock Expeditions to the Galapagos Islands and the west coast of Central America, an excellent representation of the shallow water forms. Shorter visits have also been made during week-ends to the collections in Stanford and to the University of California, Berkeley, in connection with work on Alcyonarians and on the species of Balanoglossus from the eastern part of the Pacific.

A unique collection of Alcyonarians, from almost unexplored waters of South America, have been received from the National Museum in Buenos Aires, as an exchange. During the Christmas vacation I worked on the "Albatross" collections of Alcyonarians in the U. S. National Museum in Washington, and a complete set of duplicates will be sent to the Museum of Comparative Zoology as soon as the identifications are completed. From the Hancock Expeditions various Alcyonarians have been received as gifts, while a number of species of Balanoglossus from Southern California have been donated by Dr. McGinitie, Corona del Mar, California.

Dr. John Wells, Homer, New York, spent some time in May in the collections, examining Pourtales's types from the West Indies, in connection with the revision of the Stony Corals of the world which he is undertaking in collaboration with Dr. T. W. Vaughan, La Jolla, California.

REPORT ON THE CRUSTACEA

By Fenner A. Chace, Jr.

Although the report on the status of the collections for last year indicated that the task of relabeling and cataloguing the Brachyura was well on the road to completion, numerous interruptions of various sorts have so retarded that work that it has taken all of the present year to complete it. It became apparent early in the year that the most difficult part of the collection of crabs was still awaiting attention as most of those not then catalogued were unidentified. Now, however, all of the Brachyura, with the exception of the Oxystomata, have been relabeled and catalogued and need only a final sorting into the proper trays.

A number of weeks in the fall were devoted to the collection of Crustacea on exhibition in the Synoptic Room. In most cases specimens were painted and drawings made of the smaller forms which do not lend themselves to exhibition. As soon as the labels for these specimens are printed it is felt that this small collection will illustrate the form of typical species of most of the larger divisions of the class.

Two and a half weeks in June were spent collecting at Bermuda. Thanks to the able assistance offered by Dr. J. F. G. Wheeler and other individuals at the Bermuda Biological Station, a good collection of Crustacea was obtained. One new species of shrimp and eleven species of Crustacea new to the Islands were collected.

The accessions to the collections during the past year have far exceeded those for the year before. Perhaps the most valuable lot received consisted of twenty species of crabs from the Gulf of California received in exchange for publications from Steve A. Glassell. Of the twenty species, one genus and nineteen species were new to our collections, and ten species were represented by type material. A large collection of Penaeid prawns bought in the Panama market has also been received from Mr. J. A. Griswold, Jr. Although there has been but one exchange made, a small but important one with the U. S. National Museum, a number of con-

tacts have been made which it is hoped will result in many more exchanges in the near future. Additional accessions for which thanks are given have been received from: Academy of Natural Sciences of Philadelphia, Dr. Thomas Barbour, Dr. J. C. Bequaert, Mr. J. Alden Cheever, Mr. W. F. Clapp, Mr. W. J. Clench, Dr. Elisabeth Deichmann, Mr. Pedro de Mesa, Mr. A. S. Pearse, Mr. C. M. Pomerat, Dr. L. Howell Rivero and Mr. W. C. Schroeder.

REPORT ON THE LIBRARY

By Eleanor S. Peters

A search during the past year for the oldest books in our library has brought to light some fifty published before 1600; among these are two incunabula—two editions of Albertus Magnus' "De Animalibus libri xxvi." The earlier is a folio volume published in Mantua in 1479; the later, "Novissime Impressi," a quarto published in Venice in 1495. Both volumes are well preserved; one is in a modern binding, the other in an old vellum binding (probably not the original) with goffered edges. These were the gifts of the late Samuel Garman.

Thanks to the generosity of a friend of the library, many of our old books have been cleaned and oiled by Miss Irene M. Tilden, whose work on the restoration of old books is the finest sort. She has made elaborate repairs on a few of the most valuable books, minor repairs on many others; 209 volumes in all have been thus treated and they would make a fine showing if we could bring them all together. This is a good beginning on these old books which I hope we can continue.

Last December Dr. Glover M. Allen presented two interesting books. One is by Friedrich Martens, entitled: "Spitzbergische oder Groenlandische Reise Beschreibung Gethan im Jahr 1671." It was published in 1675 in Hamburg, and contains illustrations of mammals, birds, botanical specimens and snow crystals. The other is Robertus Sibbaldus' "Phalainologia Nova sive Observationes de Rarioribus Quibusdam Balaenis in Scotiae Littus Nuper Ejectis, * * *," Edinburg, 1692. Dr. Allen believes this may be the only copy of this work in the country. Linnaeus based at least three of his whale names on material in it and the rose genus "Sibbaldia" was named after its author.

Mr. Charles H. Taylor gave us a collection of books on angling and from Dr. John C. Phillips came about a hundred volumes on sport and travel. Dr. William M. Wheeler added to his generous gifts of two and three years ago by depositing several hundred

more pamphlets. In the spring Dr. George H. Parker gave us his complete files of seven biological journals and paid for having them bound. In addition to these special accessions we have received many other gifts from members of the museum staff and from friends outside, as well as the usual transfers from the college library and various departmental libraries. Our total accessions for the year show an increase over those received the year previous.

We are constantly reminded of the crowded state of our card catalogue, which is almost full. Also, our stacks are crowded, especially in the north-west room. The museum should look with pride on the constant growth of its library, realizing at the same time that growth means increased equipment and stack space. Looking back at the figures of twenty years ago, I find that our volumes have increased from 53,000 to 77,000, pamphlets from 50,000 to 96,000. Circulation, also, has probably tripled in the same length of time. Obviously this growth brings with it also the need for a larger library staff. In 1916 there were three people working full time, and two others giving part of their time, while twenty years later there are two working full time and two working half time. We have had excellent part-time help for the past three years from the student workers assigned to the museum by the college, but at best this help is for not more than eighteen hours a week and no one student is likely to continue such work more than two years.

As I am unable for the present to be at the Museum more than three days a week, Mr. William E. Schevill has been appointed as Associate Librarian from July 1st to devote three days a week to the library.

Work on the revision of the museum's exchange list, of which a beginning was mentioned in my report of a year ago, has been continued as time allowed during the past year. When the correspondence about exchanges was turned over to the library in January much confusion was discovered which is gradually being cleared up, thanks to Mr. Schevill's help.

Our library and the Peabody Museum library acted as hosts to the Harvard Library Club last November; the exhibition rooms of the museum were opened in the evening and a small special exhibit of books and drawings was arranged by the two libraries.

The Biological Group of the Special Libraries Association held a meeting in this library in April, the topic for the evening being "Bibliography."

Four hundred and twenty-five volumes were bound in the past year. These were mostly current serials and the figure does not include the books worked on by Miss Tilden.

Total circulation for the year (August 1, 1935 to July 31, 1936) is 6,407—the museum staff borrowed 1201, students and professors 5148 and other libraries 58. The usual books were reserved for certain courses during the two reading periods.

Accessions for the year were 1380 volumes and 1858 pamphlets; the present total is 77,517 volumes and 96,726 pamphlets.

PUBLICATIONS
FOR THE YEAR 1935–1936
(1 August, 1935—31 July, 1936)
Museum of Comparative Zoölogy

Publications.—The following have been printed during the year.

BULLETIN:—

Vol. LXXVIII

No. 4. Mammalian Life Histories from Barro Colorado Island, Panama. By Robert K. Enders. 117 pp. 5 pl. October 1935.

Vol. LXXIX

No. 3. Scientific Results of an Expedition to Rain Forest Regions in Eastern Africa. III. Mammals. By Glover M. Allen and Barbara Lawrence, with Field Notes by Arthur Loveridge. 95 pp. 5 pl. January 1936.

No. 4. Scientific Results of an Expedition to Rain Forest Regions in Eastern Africa. IV. Birds. By James Lee Peters and Arthur Loveridge. 76 pp. 2 pl. January 1936.

Vol. LXXX

No. 1. The Millipeds of Hispaniola with Descriptions of a New Family, New Genera and New Species. By H. F. Loomis. 191 pp. 3 pl. April 1936.

MEMOIRS:—

Vol. LIII

The Alcyonaria of the Western Part of the Atlantic Ocean. By Elisabeth Deichman. 317 pp. 37 pl. July 1936.

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No. 3. The Placentation of the Manatee. By George B. Wislocki. 19 pp. 7 pl. December 1935.

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Application for the tables reserved for advanced students at the Woods Hole Station, of the United States Bureau of Fisheries, should be made to the Faculty of the Museum before the first of May. Applicants should state their qualifications and indicate the course of study they intend to pursue.